

# EXHIBIT 1



Apr 7 2009  
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**UNITED STATES DISTRICT COURT  
SOUTHERN DISTRICT OF NEW YORK**

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In Re: Methyl Tertiary Butyl Ether ("MtBE")  
Products Liability Litigation

MDL No. 1358  
Master File C.A. No.  
1:00-1898 (SAS)

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This document relates to the following cases:

*City of New York v. Amerada Hess Corp., et al.*

04 Civ. 3417

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**REBUTTAL REPORT OF**

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**April 7, 2009**

**Date**



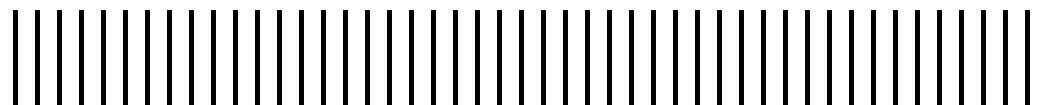
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# Bell Rebuttal Report

April 2009



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- A. Cost Opinions for Individual Wells Based on Terry Rebuttal Report 2009
- D. Adjustments to Appendix D (from Cohen and Bell Expert Report 2009)



# 1. Introduction

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This report contains rebuttal responses to the comments provided by defendants' experts regarding the Cohen and Bell Expert Report (2009). Specifically, this report addresses comments regarding MTBE treatment technologies and costs. The defendants' reports addressed in this rebuttal report include: Driscoll (2009), Hand (2009a), Hand (2009b), Mercer (2009), Sweetland (2009), and Tierney (2009).

**Section 2** responds to specific statements concerning treatment of MTBE, while **Section 3** responds to statements concerning the costs of treating MTBE. **Section 4** addresses adjustments made to the cost opinions presented in the Cohen and Bell Expert Report (2009).

The analyses, opinions, and conclusions set forth in this report were developed and prepared by Marnie A. Bell, P.E. with the assistance of others under my direction. I reserve the right to revise these opinions based on any additional information provided to me.

## 2. MTBE Treatment

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### 2.1. Introduction

This section provides rebuttal responses to comments made by Dr. Hand, Dr. Tierney, Dr. Sweetland, and Dr. Mercer regarding MTBE treatment at Station 6 and at Wells 5, 22, 26, 39, and 45. The Hand Expert Report (2009a) is based upon invalid assumptions regarding MTBE treatment at Station 6 and Wells 5, 22, 26, 39 and 45. Hand's argument that treatment will not be required at Station 6 or at Wells 5, 22, 26, 39 and 45 and his selected raw and finished water MTBE criteria are invalid. This report explains why Hand's approach is unreasonable, and therefore, why the remaining assumptions regarding his proposed design criteria for MTBE treatment at Station 6 are invalid.

### 2.2. MTBE Treatment

Hand argues that MTBE treatment will not be required for Station 6 because the MTBE concentrations in the Station 6 wells will likely be below detectable levels by the time the plant is brought online in 2016 (Hand, 2009a). Hand also claims that only Well 6D may require treatment (Hand, 2009a). However, Hand based these conclusions entirely on opinions provided in the Driscoll Expert Report (Hand, 2009a). As discussed in the Fogg Expert and Rebuttal Report and the Terry Expert and Rebuttal Report, the opinions on MTBE trends that appear in the Driscoll Expert Report are inaccurate (Fogg, 2009a; Fogg, 2009b; Terry, 2009b). Both the Fogg and Terry Reports present convincing evidence that MTBE treatment will be required for all the Station 6 wells (Terry, 2009a; Terry, 2009b, Fogg 2009a; Fogg, 2009b). Furthermore, Hand states that treatment will not be required for Wells 5, 22, 26, 39, and 45 given that the MTBE concentrations for these wells were below the maximum contaminant level (MCL) in 2007, and that the concentrations have been declining over time (Hand, 2009a). However, as presented in the Terry Expert Report and Expert Rebuttal Report, MTBE concentrations in these wells will likely increase in the future (Terry, 2009a; Terry, 2009b), and thus, it is not appropriate to evaluate future MTBE treatment requirements based on historical data.

The Mercer Expert Report (2009) states that "during pilot testing, nanofiltration (NF) and reverse osmosis (RO) were able to treat MTBE (greater than 99 percent)." RO treatment will be provided for hardness removal at Station 6, but it will not be relied upon for MTBE removal. For the following reasons, RO will not be part of the MTBE treatment approach at Station 6:

- The effects of volatile organic compounds (VOCs) on NF/RO membranes are not well understood (Malcolm Pirnie, 2004a). Therefore, there is the possibility that the membranes would not be able to meet their treatment goals.
- NF/RO is not a proven treatment technology for MTBE treatment. The Environmental Protection Agency (EPA) has identified granular activated carbon (GAC) and packed tower aeration (PTA) as the best available technologies (BAT) for removing all VOCs with the exception of vinyl chloride from drinking water (Calabrese, 1989). Additionally, the EPA lists air stripping, GAC, and advanced oxidation as applicable technologies specifically for MTBE treatment for public water systems (EPA, 1997).
- The RO membranes produce a by-product stream known as concentrate or brine. Using RO for MTBE removal would result in production of a concentrated MTBE sidestream that would require costly treatment prior to discharge (Malcolm Pirnie, 2004a). The concentrated sidestream would need to be treated to meet applicable sanitary or storm sewer discharge requirements. Currently, New York City Department of Environmental Protection (NYCDEP) is required to meet a sanitary sewer discharge limit of 50 µg /L and a stormwater discharge limit of 10 µg/L for MTBE (NYCDEP, 2008c; NYSDEC, 2008). Data collected during pilot testing reported MTBE concentrations in the NF concentrate at 870 µg/L when MTBE in Well 6D reached 350 µg/L (Malcolm Pirnie, 2002-2003).
- Finally, the Station 6 plant will only provide RO treatment for a portion of the plant flow (Malcolm Pirnie, 2004b). A separate portion of the plant flow will be bypassed around the RO treatment in order to meet the hardness treatment objectives in the finished water. This bypass stream would not receive treatment via RO; therefore, if RO was relied upon for MTBE removal, this bypass would not receive MTBE treatment, which could allow the MTBE concentration of the combined treated water to exceed the MCL.

Therefore, attempting to use RO for MTBE treatment is an invalid approach.

### 2.3. Finished Water Treatment Objectives

Finished water treatment objectives for potable water facilities such as Station 6 must protect human health, meet all regulatory requirements, and result in a product with no objectionable tastes or odors to the consumers. Design criteria must also align with the utility's mission statement and their specific water quality goals. Hand and Tierney have both proposed finished water treatment goals that are not consistent with engineering best practices for potable water applications. Tierney (2009) states that "governance and economic policy considerations support the use of a treatment objective no lower than 5 µg/L." Additionally, Hand has selected different finished water treatment goals for air stripping and GAC treatment (Hand, 2009a). Sweetland has also commented on NYCDEP finished water goals (Sweetland, 2009). A discussion regarding the treatment goals for each technology is provided below.



### 2.3.1. General

Sweetland (2009) points to the concentrations of MTBE historically detected in Well 5 as being below “New York City’s self-imposed treatment target.” The concept of a self-imposed treatment target is misleading, as NYCDEP has never declared such a thing, but rather sets a goal to provide water from the Groundwater System of equal quality to water from the upstate sources, which is free of MTBE. Further, in New York State, adding new treatment systems to a public water supply requires the approval of the New York State Department of Health (NYSDOH) (2007). NYSDOH reviews all plans and specifications for compliance with the *Recommended Standards for Water Works, 2003 Edition* (NYSDOH, 2007). Additionally, the NYSDOH has the authority to impose additional requirements (not specifically listed in the *Recommended Standards for Water Works*) that it deems necessary to adequately protect public health and safety. The *Recommended Standards for Water Works* includes the following statements regarding the control of organic contamination (Ten States, 2003):

“In all cases, public exposure to organic contamination must be minimized.”

“Where treatment is proposed, best available technology shall be provided to reduce organic contaminants to the lowest practical levels.”

### 2.3.2. Air Stripping Treatment Goal

Hand has selected a finished water treatment objective of slightly below the MCL of 10 µg/L for the air stripping alternative based on the following rationale (Hand, 2009a):

“Air stripping is a steady state process and it is very easy to adjust the operational parameters, so a treatment objective just below the MCL is both reasonable and appropriate.”

Although Hand has indicated that he has proposed a treatment goal slightly less than the MCL (Hand, 2009a), it is unclear what value was used in his analysis. Hand’s Table 6 reports a treatment objective of 9.9 µg/L, while Table 8 reports finished water concentrations of 9.94, 9.95, 9.89, and 9.92 µg/L (Hand, 2009a). Hand’s proposed finished water treatment goal does not meet NYSDOH regulatory requirements as described above. Additionally, Hand has not considered utility-specific requirements.

Air stripping is well understood and water quality professionals have a high degree of confidence in the tools available to predict design parameters and performance; however, these are predictions and the actual removal efficiencies will vary from these predictions (CMRP, 2006). Therefore, appropriate safety factors must be incorporated to account for site specific conditions and potential design or operational inefficiencies (e.g., short circuiting, temperature, Henry’s constant,  $K_{La}$ , etc.) (Ball and Edwards, 1992).